Innovative approaches to Emergency and Disaster Medicine Education

UNIVERSITÀ DEL PIEMONTE ORIENTALE

CRIMEDIM

RESEARCH CENTER IN EMERGENCY AND DISASTER MEDICINE

救災 HKJCDPRI

architecture for humanitarian crisis and disaster management

Hong Kong Academy of Medicine

香港醫學專科學院

Hello!

I am Marta Caviglia

MD, Department of Anesthesiology and Critical Care
Researcher in Disaster Medicine and Humanitarian Health, CRIMEDIM

CRIMEDIM

CRIMEDIM is a university-wide academic center that conducts research, education and training in the field of disaster medicine and humanitarian health.

The center is committed to promote innovative research projects and to foster learning and training programs using state of the art technologies to enhance the resilience of health systems in emergency, disaster and humanitarian crisis.

World Health Organization

CRIMEDIM – Research Center in Emergency and Disaster Medicine. Address: Via Lanino, 1 – 28100 Novara (NO) Country: Italy. www.crimedim.uniupo.it

CRIMEDIM

MAIN AREAS OF ACADEMIC EDUCATION AND TRAINING

1 DISASTER MEDICINE EDUCATION AND TRAINING FOR DISASTER MANAGERS, LEADERS AND POLICY MAKERS

- European Master in Disaster Medicine (EMDM)
- PhD in Disaster Education, Disaster Medicine and Humanitarian Health
- Disaster and humanitarian fellowship

2 DISASTER MEDICINE EDUCATION AND TRAINING FOR HEALTH PROFESSIONALS

- Humanitarian Medic
- Disaster Medic
- Hospital Disaster Preparedness
- Pre-deployment Training for Ebola Emergency Response

3 DISASTER MEDICINE EDUCATION AND TRAINING FOR MEDICAL AND NURSING STUDENTS

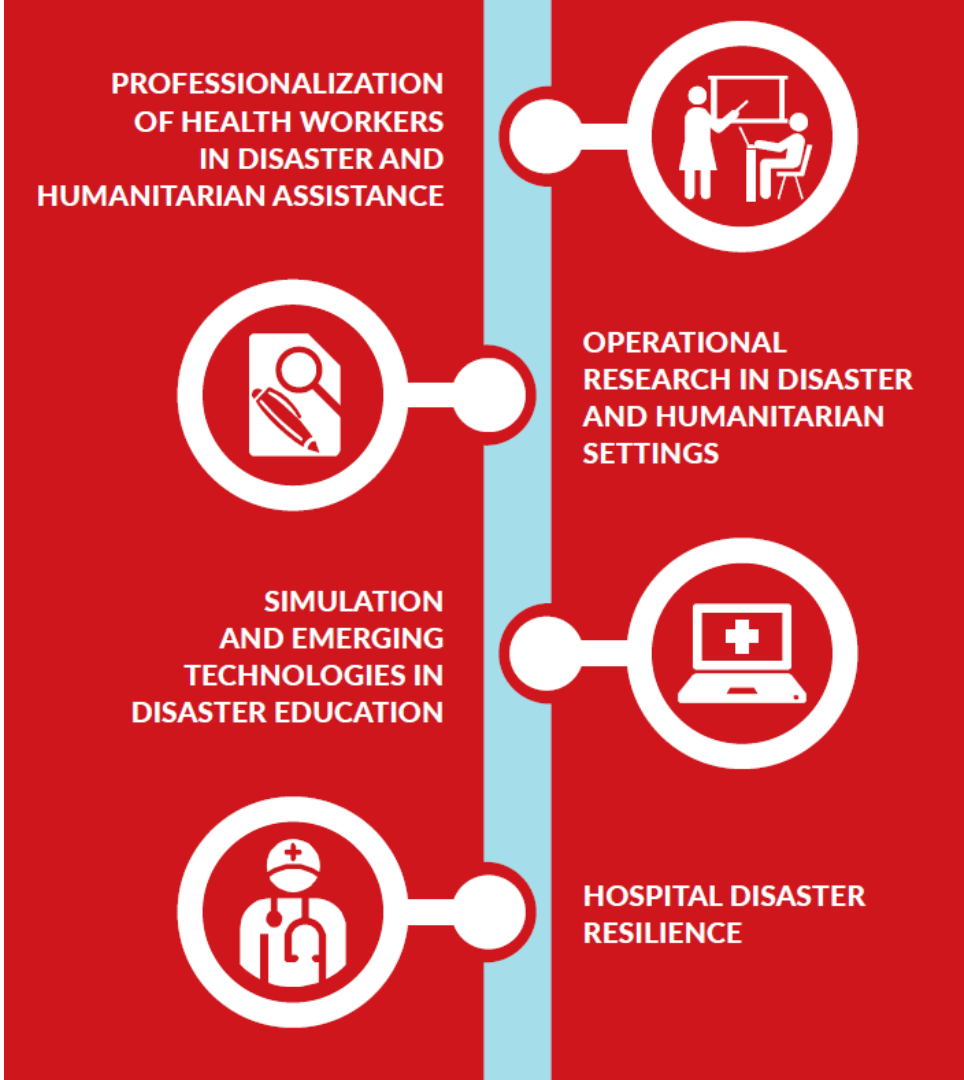
- TdmT - Training disaster medicine Trainers
- DisasterSISM
- Disaster Medicine module in the standard medical curriculum at the Università del Piemonte Orientale

4 AD HOC CURRICULUM AND SIMULATION BASED TRAINING DEVELOPMENT

- Basic and Advanced Modular Courses for Health Professionals
- Instructor Course and Faculty Development
- Scenario-Based Training

CRIMEDIM

MAIN AREAS OF REASEARCH



Disaster Medicine

PollEv.com/martacavigli852

Disaster Medicine

DISASTER

A serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts.

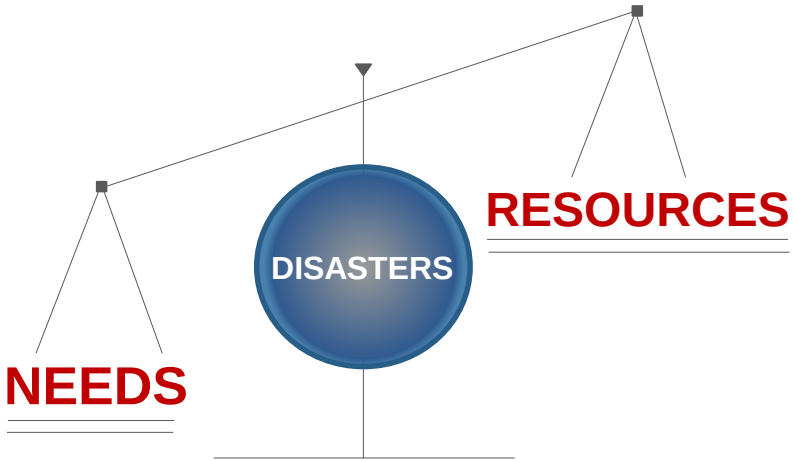
(UNISDR) [2 February 2017]

www.preventionweb.net/english/professional/terminology

Disaster Medicine

DISASTER

The effect may test or exceed the capacity of a community or society to cope using its own resources, and therefore may require assistance from external sources, which could include neighbouring jurisdictions, or those at the national or international levels.



(UNISDR) [2 February 2017]

www.preventionweb.net/english/professional/terminology

Disaster Medicine

EMERGENCY

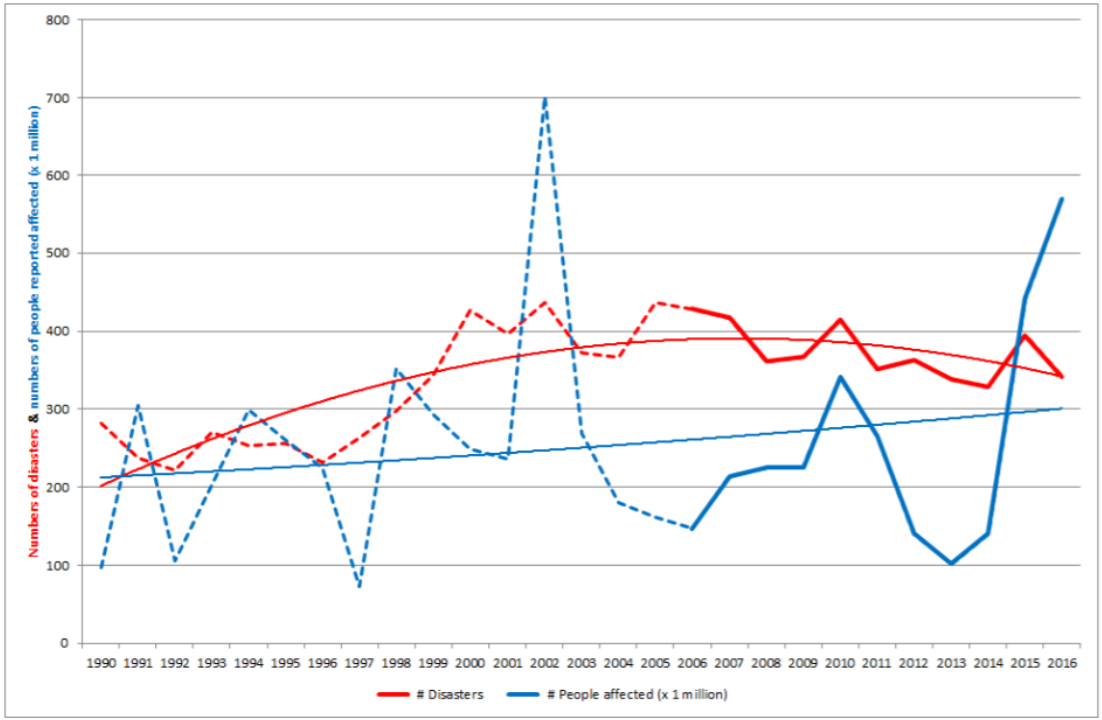
Emergency is sometimes used interchangeably with the term disaster, as, for example, in the context of biological and technological hazards or health emergencies, which, however, can also relate to hazardous events that do not result in the serious disruption of the functioning of a community or society.

(UNISDR) [2 February 2017]

www.preventionweb.net/english/professional/terminology

Disaster Medicine

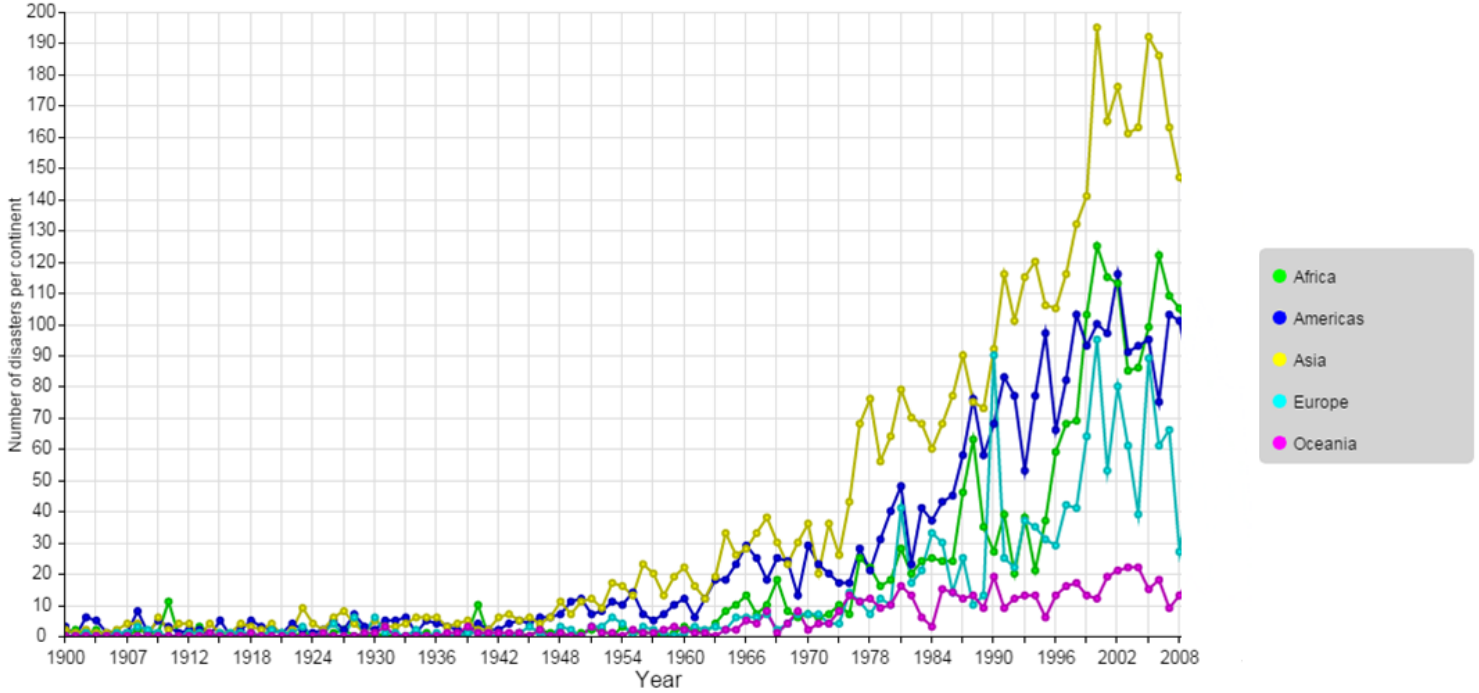
Figure 2: Numbers of disasters and total people reported affected (x 1 million): 1990-2016



Annual Disaster Statistical Review 2016

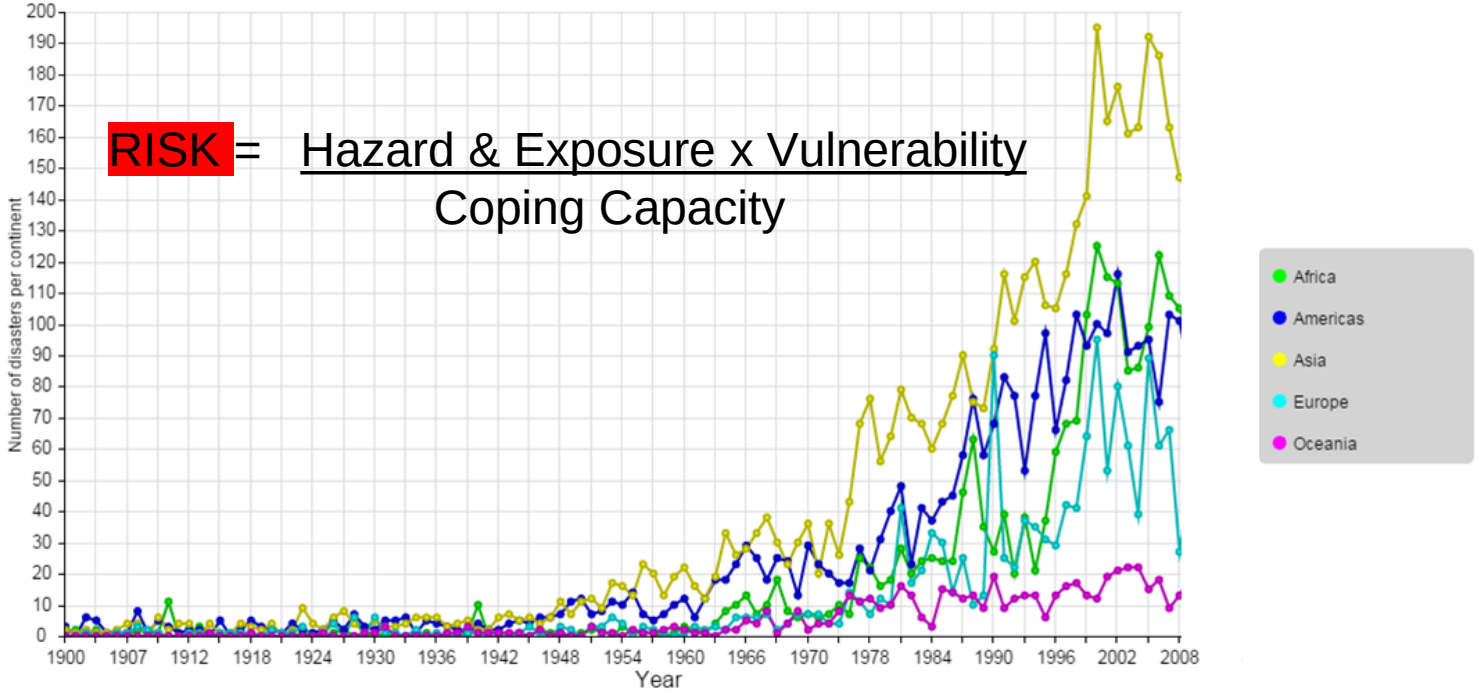
www.emdat.be

Disaster Medicine



Disaster Medicine

RISK = Hazard & Exposure x Vulnerability / Coping Capacity

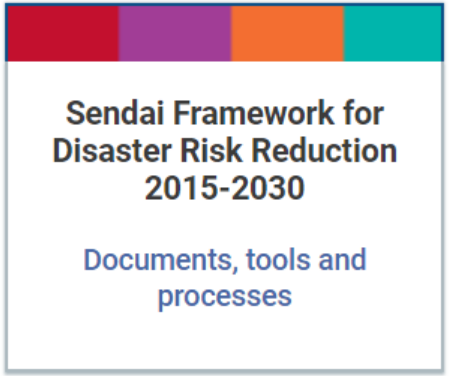


Disaster Medicine

Disaster Medicine

DISASTER MANAGEMENT

The organization, planning and application of measures preparing for, responding to and recovering from disasters.



UNISDR

Terminology

www.preventionweb.net/english/professional/terminology

Disaster Medicine

Sendai Framework for Disaster Risk Reduction 2015-2030

Documents, tools and processes

UNISDR

Terminology

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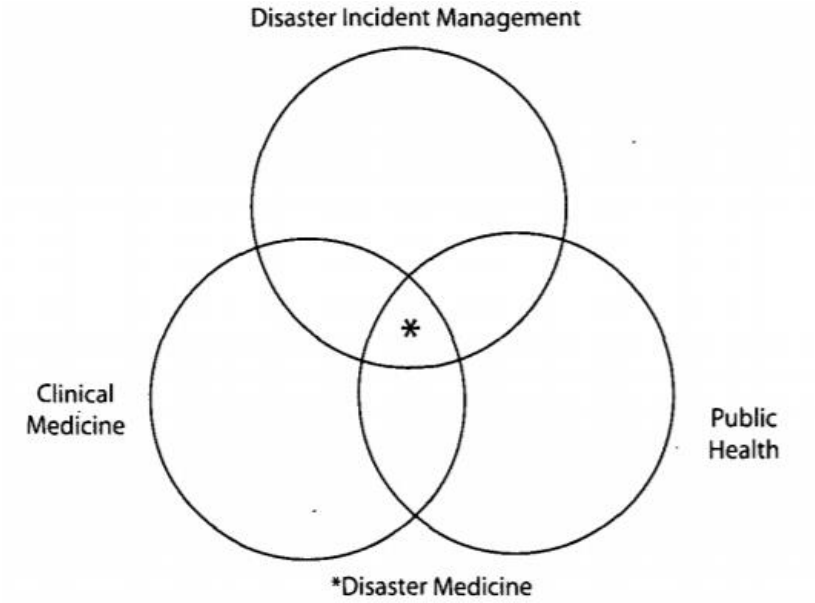
Disaster Medicine



Professionalization of Disaster Medicine—An Appraisal of Criterion-Referenced Qualifications

David A. Bradt, MD, MPH, FACEM, FAFPHM, DTM&H;[1]
Christina M. Drummond, MBBS, DObstRCOG, DTM&H, FRACP, MPH, MAE, FAFPHM[2]

- Disaster Medicine Expert
- Disaster Medicine for Health Care Providers
- Disaster Medicine for Medical Students

Disaster Medicine

‘’Enhance the resilience of national health systems, including by integrating disaster risk management into primary, secondary and tertiary health care, especially at the local level’’

Education and training for a wide spectrum of health care professionals, including medical students, will improve resilience of communities towards disasters

Challenges: state of the art

- lack of awareness and education among communities and medical students
- lack of education and training of the different parties involved in the medical management of disasters
- no explicit inter-agency standards for evaluation of health personnel who respond to disasters

* *Perspectives of future physicians on disaster medicine and public health preparedness: challenges of building a capable and sustainable auxiliary medical workforce.* Kaiser HE[1], Barnett DJ, Hsu EB, Kirsch TD, James JJ, Subbarao I.

* *Identifying deficiencies in national and foreign medical team responses through expert opinion surveys: implications for education and training.* Djalali A1, Ingrassia PL1, Corte FD

Challenges: state of the art

- high willingness to fill the formative gap and welcome specific training in disaster medicine during medical school
- high interest in participating in future humanitarian deployments
- strong believe that further professionalization within the humanitarian aid sector is required

* *Italian medical students and disaster medicine: awareness and formative needs.* Ragazzoni L[1], Ingrassia PL[2], Gugliotta G[3], Tengattini M[3], Franc JM[4], Corte FD[5].

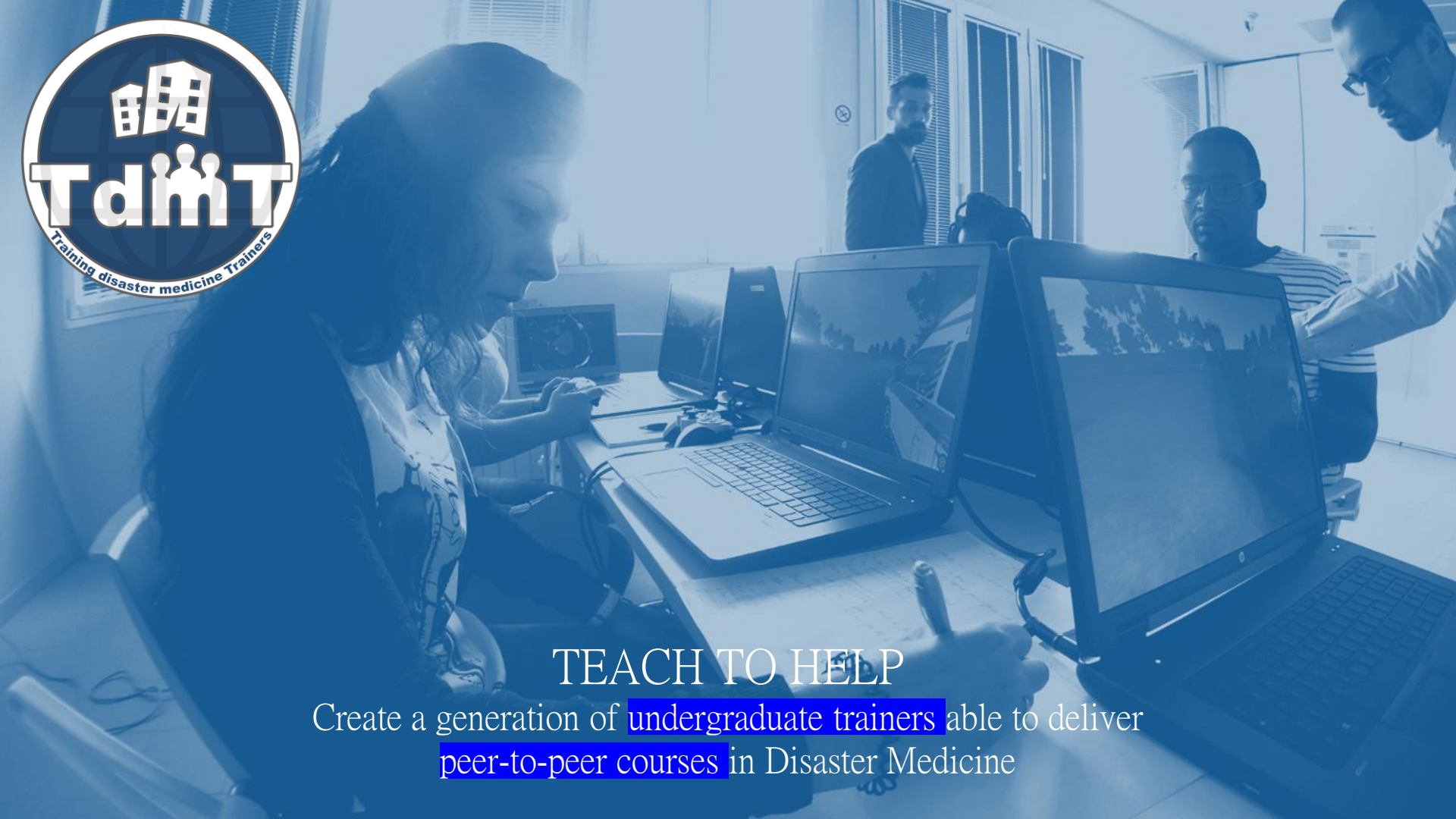
* *Knowledge Levels and Training Needs of Disaster Medicine among Health Professionals, Medical Students, and Local Residents in Shanghai, China* Tong Su, Xue Han, Fei Chen

CRIMEDIM courses

- Disaster Medicine Experts
- Health Care Providers
- Medical Students

EM DM EUROPEAN MASTER DISASTER MEDICINE

HM humanitarian medic
Disaster and Humanitarian Health Response Training Program

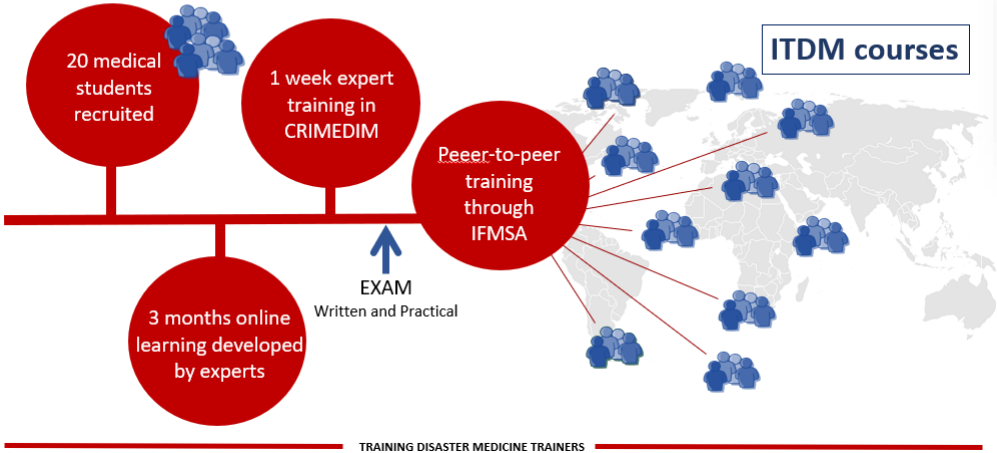


TEACH TO HELP

Create a generation of undergraduate trainers able to deliver peer-to-peer courses in Disaster Medicine

TdmT

A Community of Undergraduate Disaster Medicine Trainers



Advances in Medical Education and Practice
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open access to scientific and medical research
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REVIEW

Medical students-as-teachers: a systematic review of peer-assisted teaching during medical school

Peer-Assisted Learning (PAL)

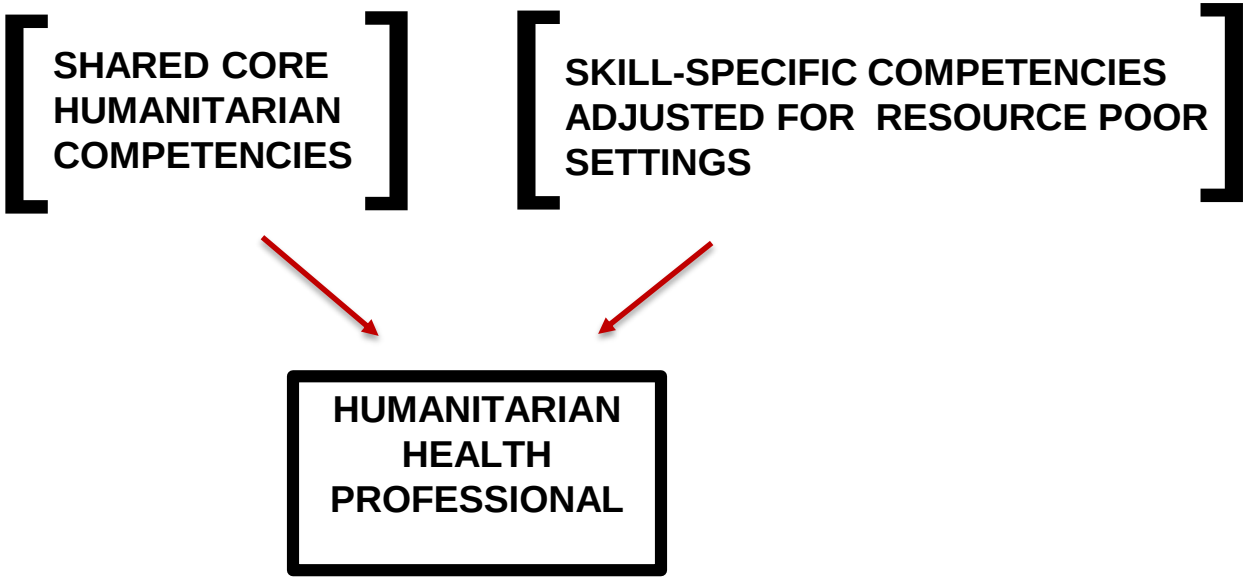
- Comparable to conventional education
- “Cognitive congruence”
- “Social congruence”

HM humanitarian medic

TEACH TO HELP

Necessary knowledge, skills and attitudes to proficiently participate to international disaster responses and humanitarian health programs

HumMedic



Burkle Jr FM,Walls AE, Heck JP et al. *Academic affiliated training centers in humanitarian health, Part 1: program characteristics and professionalization preference of centers in North Americ*al. Prehosp Disaster Med. 2013:28(2):155-162

EM DM EUROPEAN MASTER DISASTER MEDICINE

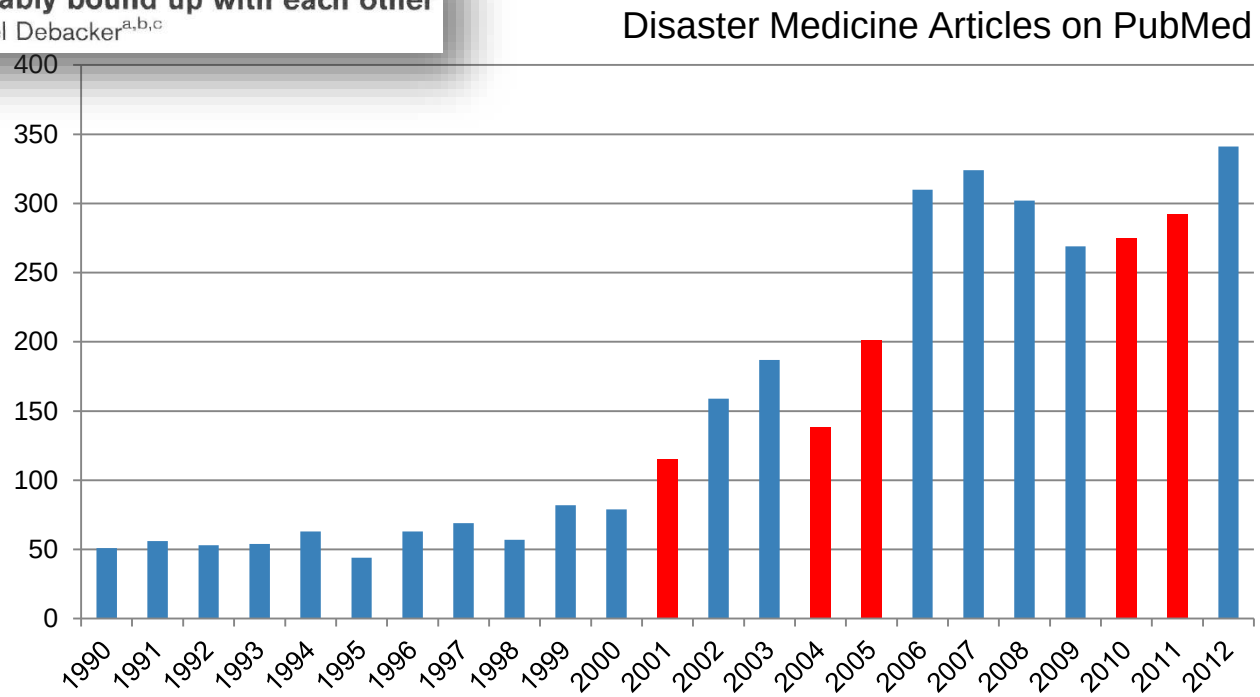
TEACH TO HELP

competencies to contribute to the body of knowledge of disaster medicine and disaster medical management, the ability to conduct independent research and the skills of creative and flexible problem-solver and decision-maker under crisis situations

EMDM

Education and research in disaster medicine and management: inextricably bound up with each other

Ives Hubloue[a,b,c] and Michel Debacker[a,b,c]



CRIMEDIM courses

E-LEARNING

RESIDENTIAL

CERTIFICATE

ADULT Learning

Passive reception

Active inquiry

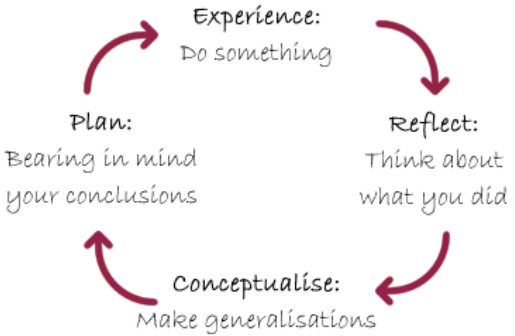
PEDAGOGY

Teacher-focused education

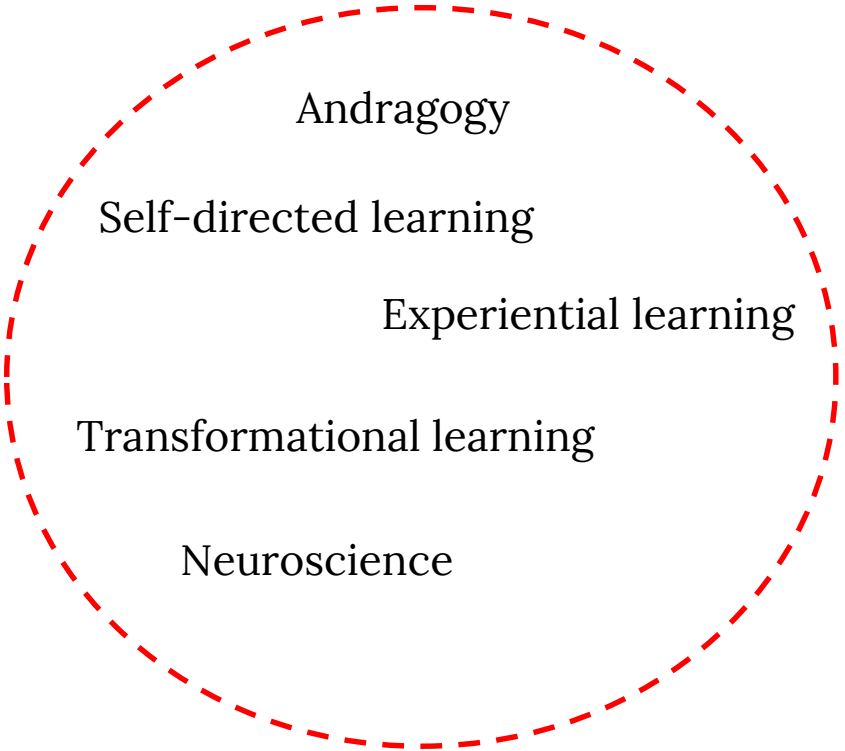
ANDRAGOGY

Learner-focused education

ADULT Learning

Andragogy	Self-Directed Learning	Experiential Learning
Students bring in their experiences to guide them along the journey of learning	Students take ownership of their learning	The essence of adult learning is making sense of experiences.
❑ Need for Knowledge ❑ Motivation ❑ Willingness ❑ Experience ❑ Self direction ❑ Orientation to learning	❑ Set their learning goals ❑ Engage in the learning process (Learning Style) ❑ Self-reflection and self-evaluation	

ADULT Learning



- To address perceived learner needs
- Choose instructional strategies in alignment with real learning contexts
- Choose the technology that best supports the instructional strategy

ADULT Learning

- Substantial experience
- Immediately useful
- Decide for themselves
- Need to validate
- Resource for teacher and fellow learners

ADULT Learning

- Involve participants
- Serve as facilitator
- Recognize and respect their expertise
- Encourage to share experiences
- Explain training objectives

ADULT Learning

“Tell me, and I will forget.
Show me, and I may remember.
Involve me, and I will understand.“
Confucio

ADULT Learning

- Learn By Doing
  - Simulation

Simulations

- Learn By Doing
  - Simulation
    - Automatic Actions

Simulations

Anger
Sadness
Anxyety Fear
Emotions

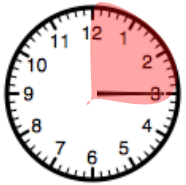
Timing Stress
Under Pressure
Maximum Speed

Cognitive
Information Overload
Selective Attention
Less Risky Choices

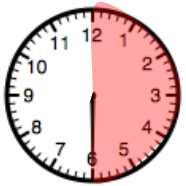
Routine
Automatic Action
Previous Experiences
Behavioural Patterns

Simulations

- Automatic Actions



- Retarded Actions



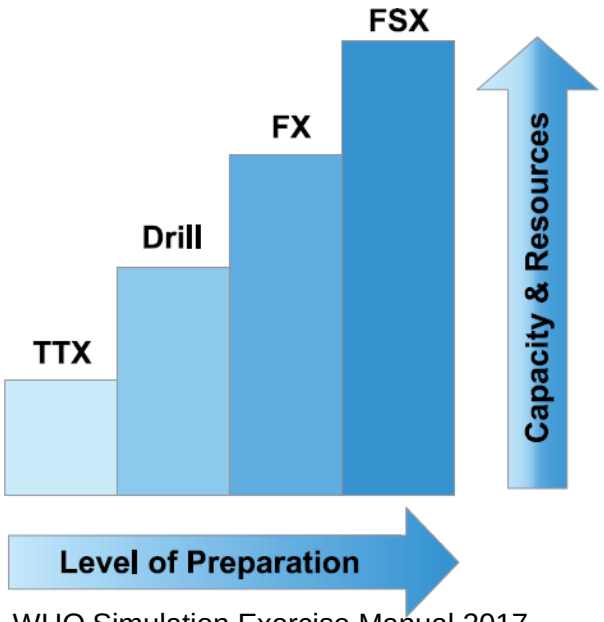
- Freezing

Simulations

- Virtual Reality Simulations
- Table Top Simulations
- Real Size Simulations

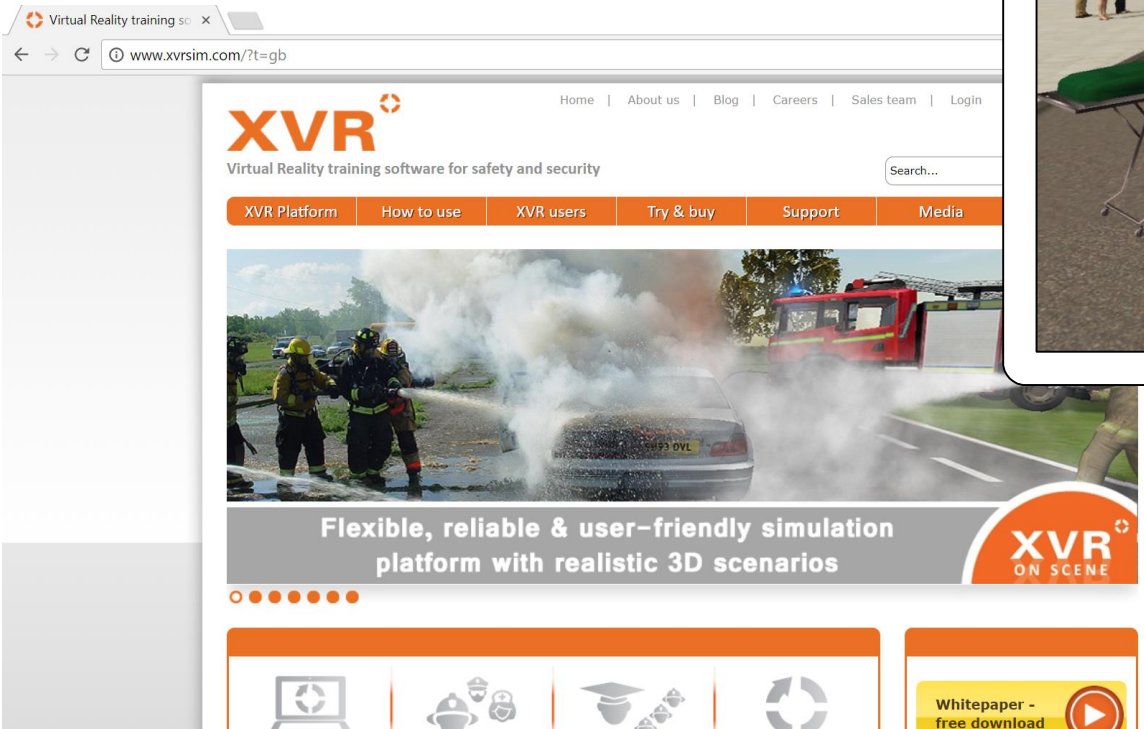
Simulations

Building Block Approach
start with basic exercises that test specific aspects of preparedness and response, followed by progressively complex exercises requiring additional preparation time and resources.



WHO Simulation Exercise Manual 2017

XVR on Scene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Flexible, reliable & user-friendly simulation platform with realistic 3D scenarios
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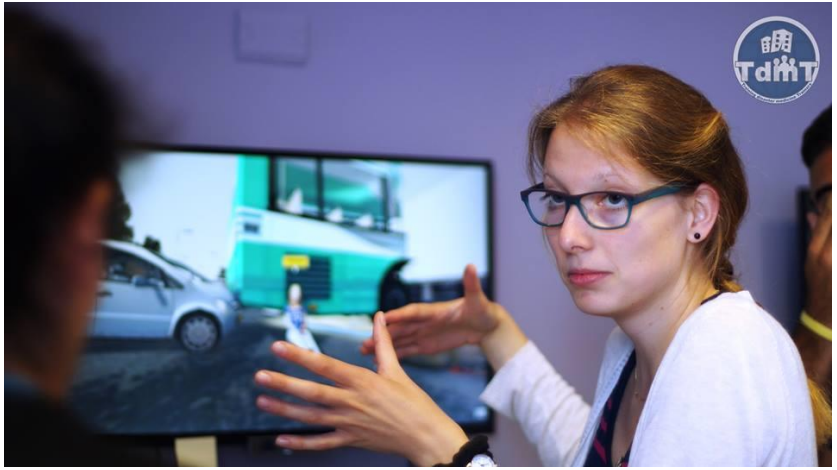
Whitepaper - free download

XVR on Scene

Type of training

- ❑ Individual training
- ❑ Team training

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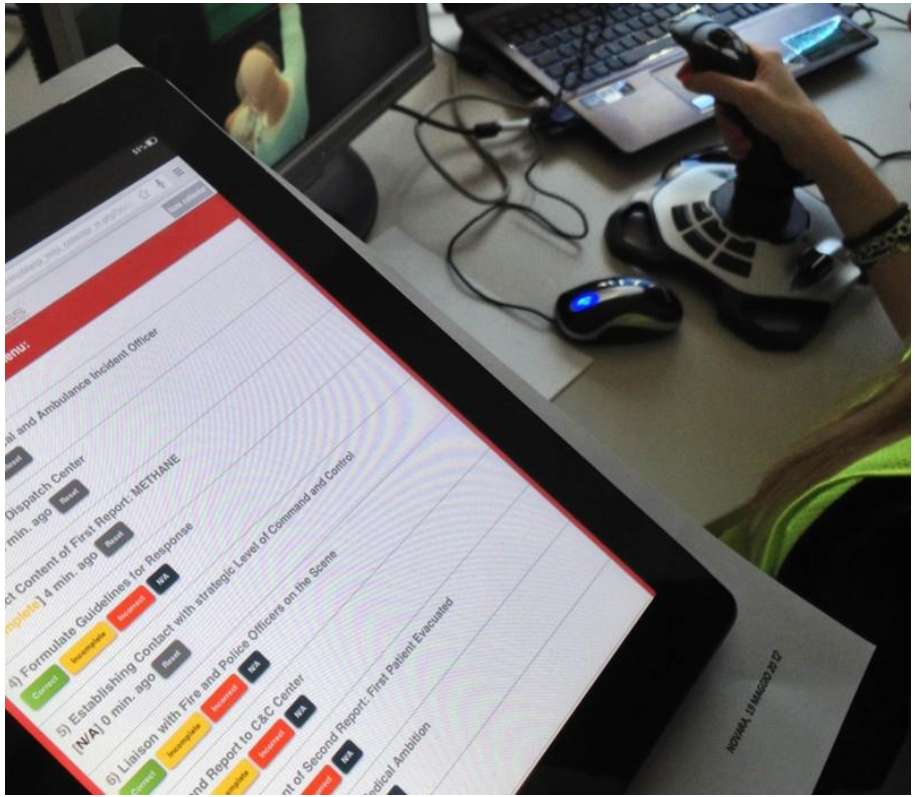
XVR on Scene

Aim

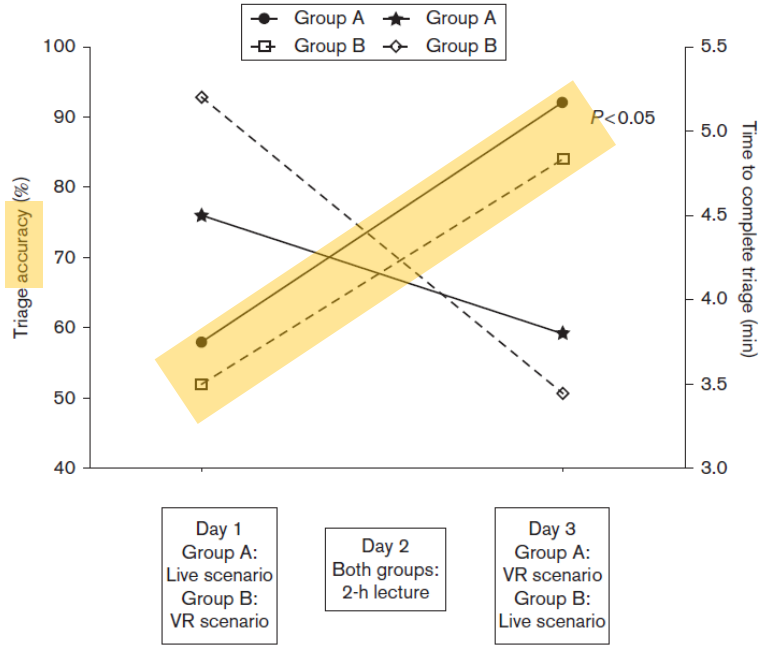
- Interactive teaching
- Train & Exercise
- Evaluate



Research

Virtual reality and live simulation: a comparison between two simulation tools for assessing mass casualty triage skills

Pier Luigi Ingrassia, Luca Ragazzoni, Luca Carenzo, Davide Colombo, Alba Ripoll Gallardo and Francesco Della Corte



Comparison of the improvement in triage accuracy and speed in both groups through the timeline. The upper line graph shows the increased triage accuracy in group A (●) and in group B (□) and the decreased time to complete triage in group A (★) and in group B (◇) from day 1 to day 3. VR, virtual reality.

Research

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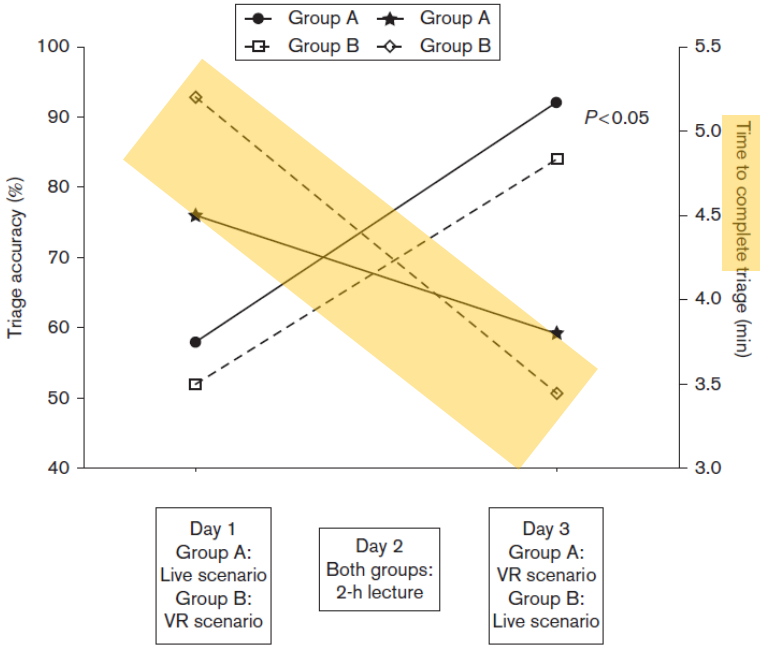

Comparison of the improvement in triage accuracy and speed in both groups through the timeline. The upper line graph shows the increased triage accuracy in group A (●) and in group B (□) and the decreased time to complete triage in group A (★) and in group B (◇) from day 1 to day 3. VR, virtual reality.

VR simulation, compared with live simulation, had equivalent ability in assessing MCT skills, in terms of triage accuracy, intervention correctness, and speed, of naive medical students using the START triage algorithm, and to detect improvements in the medical expertise after a 2-h lecture

”

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UPO CRIMEDIM

Research

Comparison of the Sacco Triage Method Versus START Triage Using a Virtual Reality Scenario in Advance Care Paramedic Students

Trevor Nirmal Jain, MSM CD, MScDM, MD*; Luca Ragazzoni, MD†; Henrik Stryhn, MSc, Samuel J. Stratton, MPH, MD§; Francesco Della Corte, MD§

Table 1. Patient parameters with known outcomes from a train accident in Chartsworth, Los Angeles, California, on September 12, 2008

Victim ID	Sex	Age	Airway	RR	HR	CRT	Amb	Outcome
43	M	19	Clear	16	110	<2	Y	Released from ER with superficial abrasions
282	F	17	Clear	18	90	>2	Y	Fractured wrist, reduced and casted, released
378	M	44	Clear	20	130	>2	Y	Resuscitated with IV fluids, wound repair by plastics
380	M	60	Clear	18	130	>2	N	Liver laceration, right hemothorax, right tib/fib fracture, pelvic fracture, died day 3 of sepsis
412	F	27	Clear	24	130	<2	Y	Deep lacerations, right eye globe rupture, lived with right vision loss
538	F	60	Clear	24	100	<2	N	Taken to OR for reduction of hip dislocation, left ankle fracture reduction
784	M	57	Clear	12	45	>2	N	Left initially by first responders, upon return found pulseless, pronounced dead in the field
803	M	23	Clear	22	110	<2	Y	Traumatic pancreatitis, discharged one week later
864	F	32	Clear	26	110	<2	N	Required mild sedation, released to family
911	F	32	Obstructed	12	140	>2	N	Released from pinned position, suffered respiratory arrest, pronounced dead in the field

Figure 1. A screenshot of the virtual reality scenario environment with an example of Triage Card visualized during the simulation.

XVR on Scene

in Disaster Medicine

CONCEPTS

Virtual Reality Simulation Training for Ebola Deployment

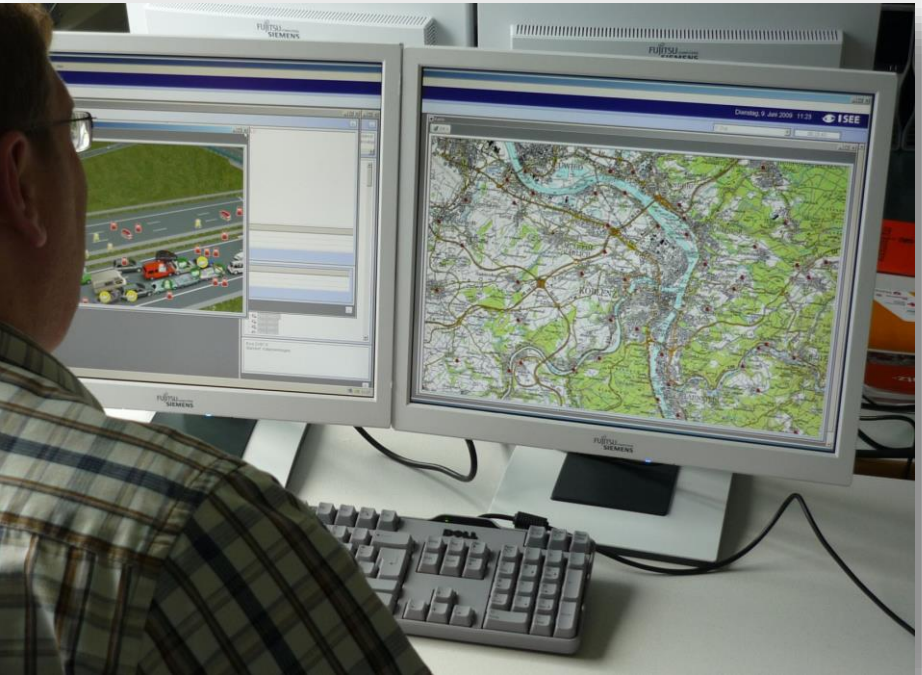
Luca Ragazzoni, MD; Pier Luigi Ingrassia, MD, PhD; Lina Echeverri, MD; Fabio Maccapani, MD; Lizzy Berryman; Frederick M. Burkle, Jr, MD, MPH, DTM; Francesco Della Corte, MD

ABSTRACT

Both virtual and hybrid simulation training offer a realistic and effective educational framework and opportunity to provide virtual exposure to operational public health skills that are essential for infection control and Ebola treatment management. This training is designed to increase staff safety and create a safe and realistic environment where trainees can gain essential basic and advanced skills. (*Disaster Med Public Health Preparedness*. 2015;9:543-546)

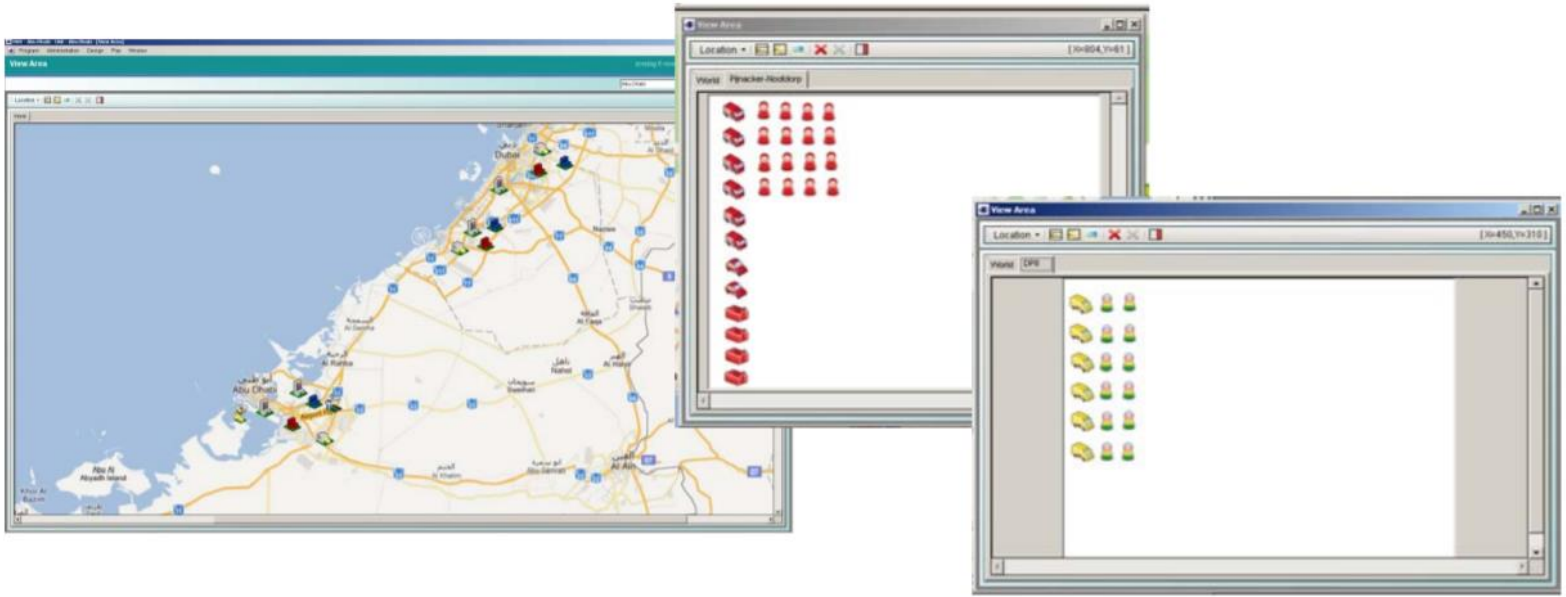
Keywords: Ebola, professionalization, simulation, education and training

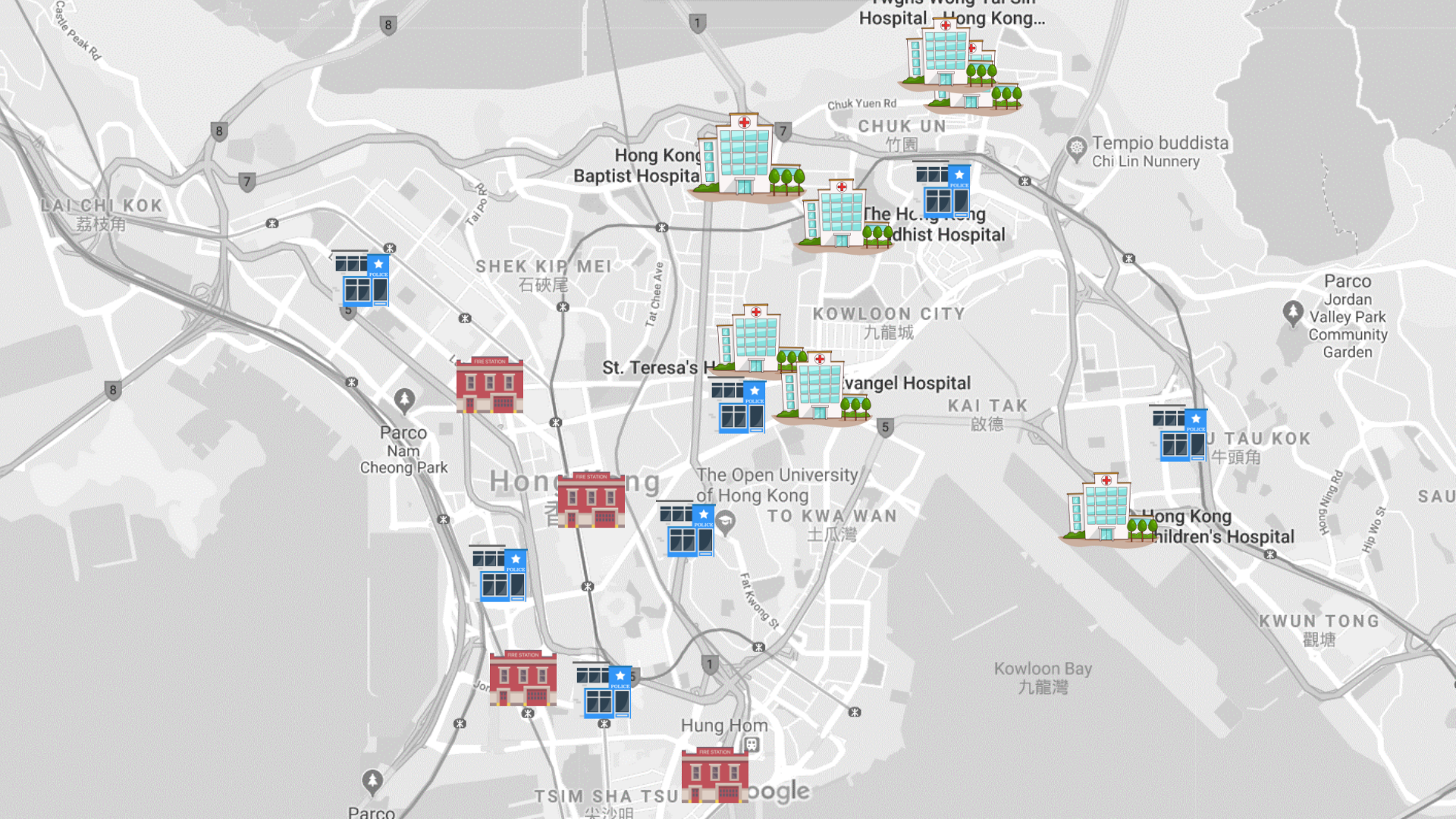
ISEE



ISEE

The basis for ISEE is a representation of your region inside ISEE through GIS maps. On these maps, all active and storage locations where incident management staff, vehicles and materials are present are recreated. The realistic number of resources are positioned in every virtual location. The travel time module in ISEE simulates realistic distances and travel times.

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The Open University
of Hong Kong
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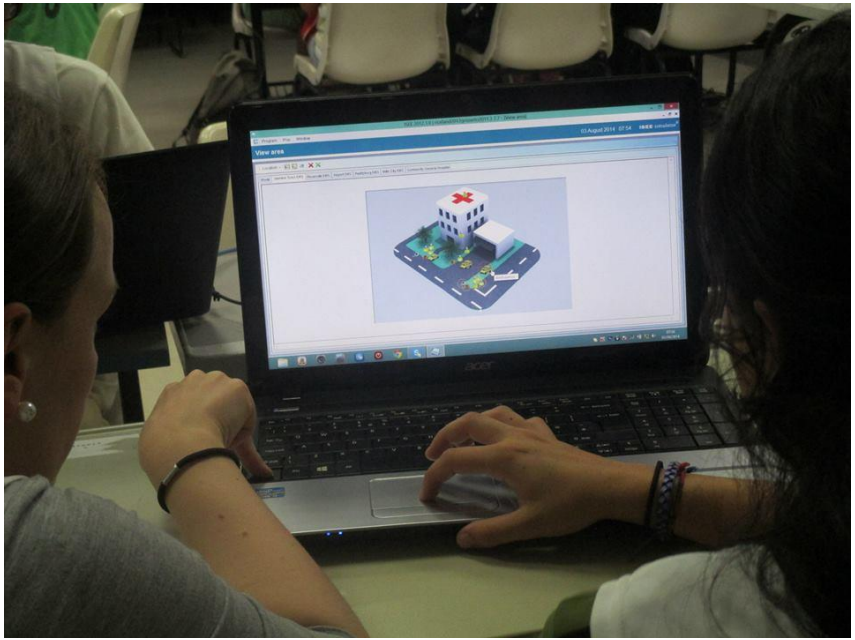

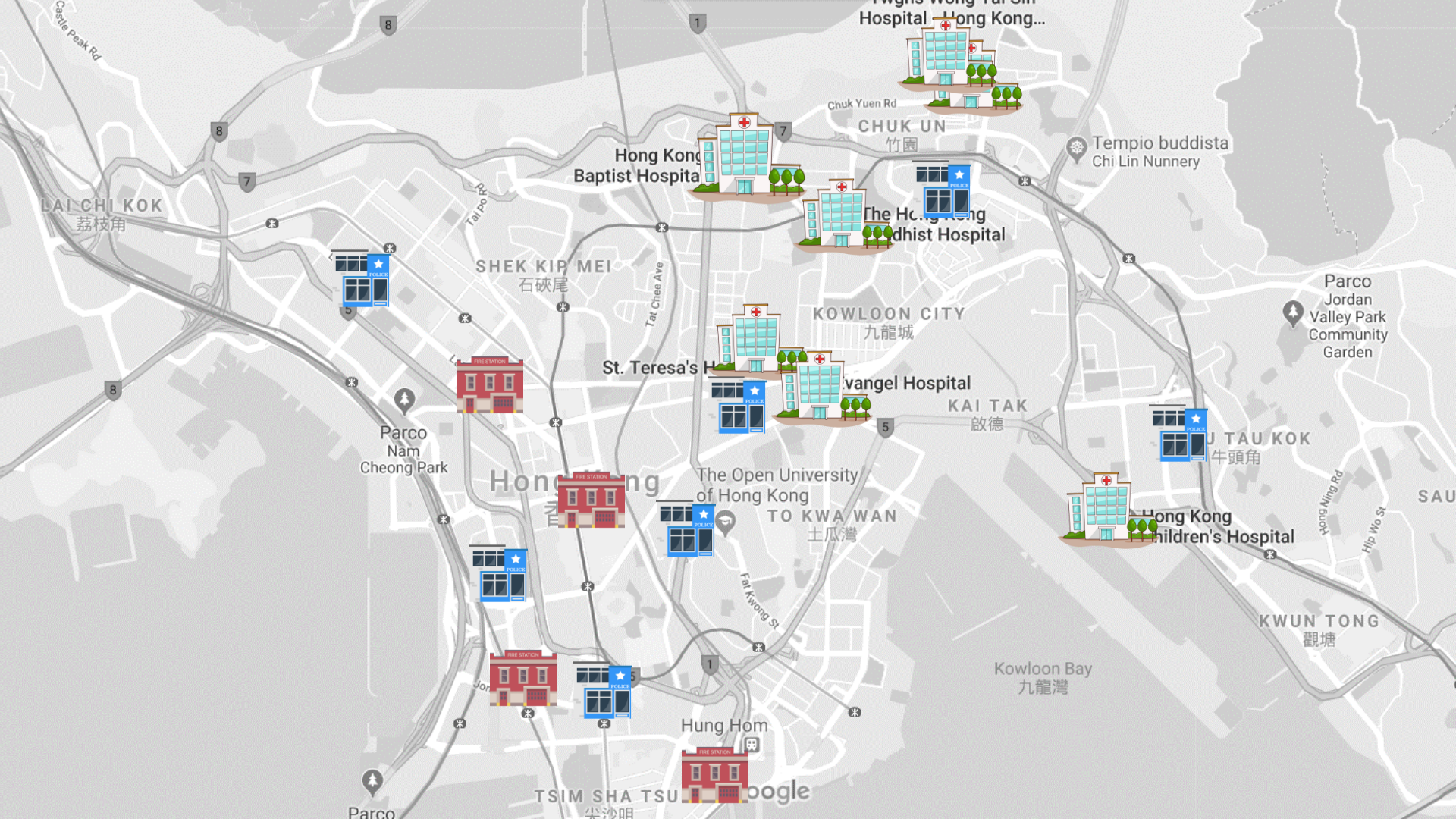
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Chi Lin Nunnery
Hong Kong
Baptist Hospital
KOWLOON CITY
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啟德
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Valley Park
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Cheong Park
The Open University
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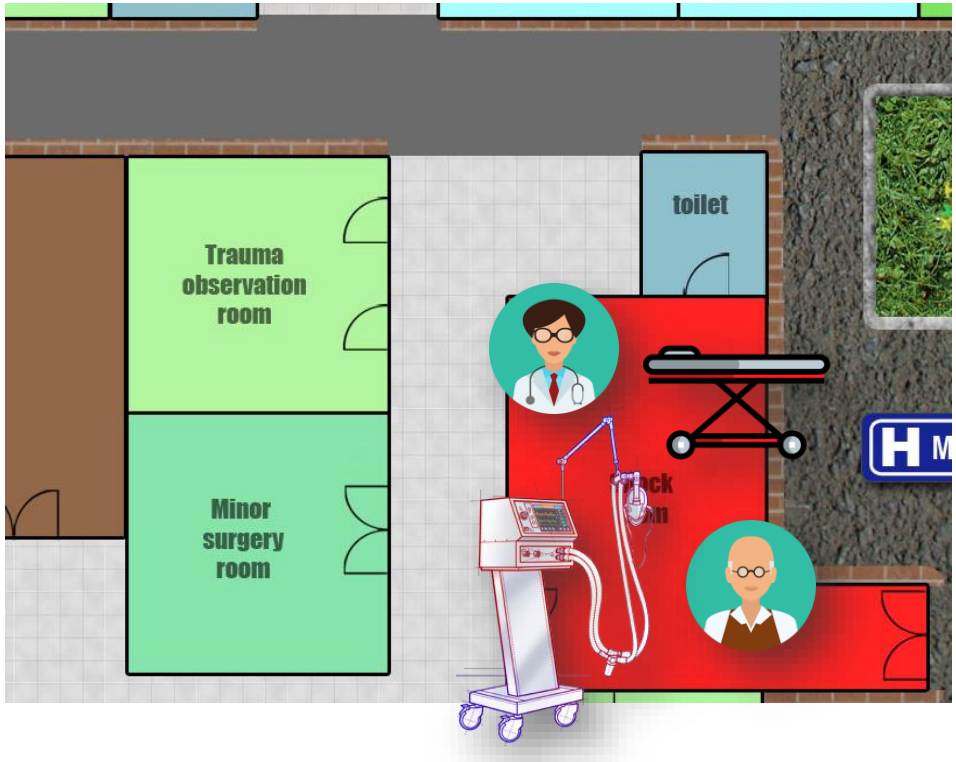
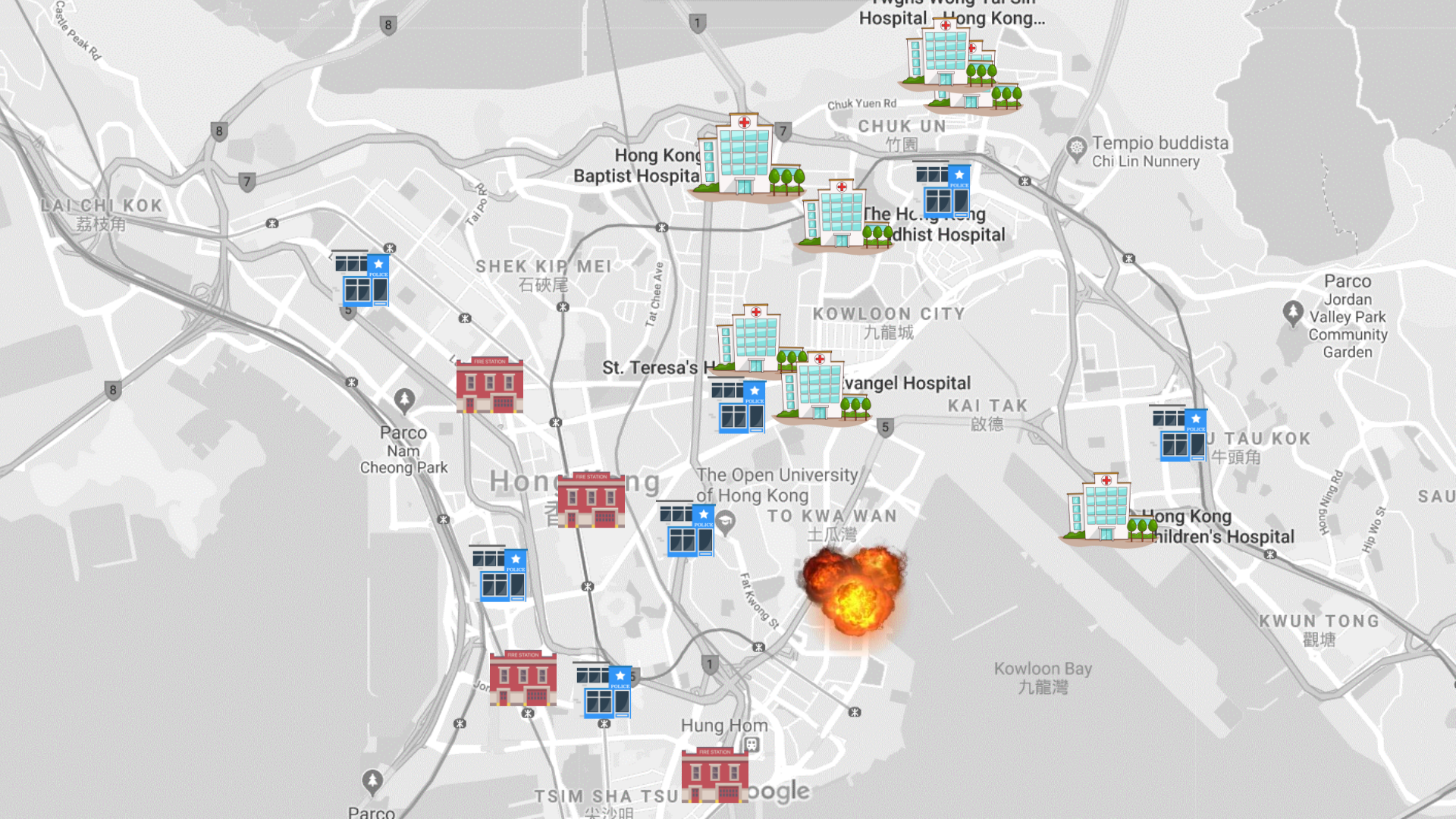
ISEE


Millin University H.
Control room
X- Rays ER
Develop room
storage
Referral room
Acceptance
Medical office
Kitchen
Nurse
Storage
toilet
Ward (max 2 pts)
Echography
CT Scan
Trauma observation room
Minor surgery room
Medication room 3
Medication room 2
triage 2
triage 1
admissions
EMS/11B/911 room
Waiting room
ER entrance
Ophtalmology observation room
ENT observation room
Nurses
White code observation room
White code waiting room

ISEE


Trauma observation room
Minor surgery room
toilet


Millin University H.
ER entrance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竹園
Tempio buddista
Chi Lin Nunnery
LAI CHI KOK
荔枝角
Tai Po Rd
SHEK KIP MEI
石硤尾
Tat Chee Ave
KOWLOON CITY
九龍城
Parco
Jordan
Valley Park
Community
Garden
KAI TAK
啟德
Parco
Nam
Cheong Park
The Open University
of Hong Kong
TO KWA WAN
土瓜灣
Fat Kwong St
Hong Ning Rd
Hip Wo St
KWUN TONG
觀塘
Kowloon Bay
九龍灣
Hung Hom
TSIM SHA TSU
Google

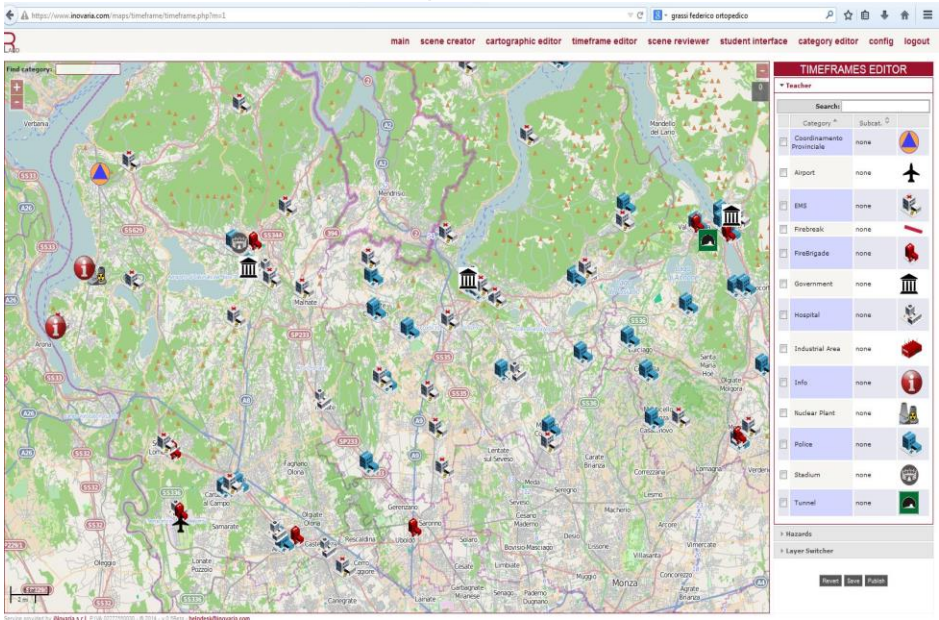

AMBULANCIA


ISEE simulator

ISEE

Aim

- Train & Exercise
  - Preparedness & Planning
  - Response
- Evaluate a response plan



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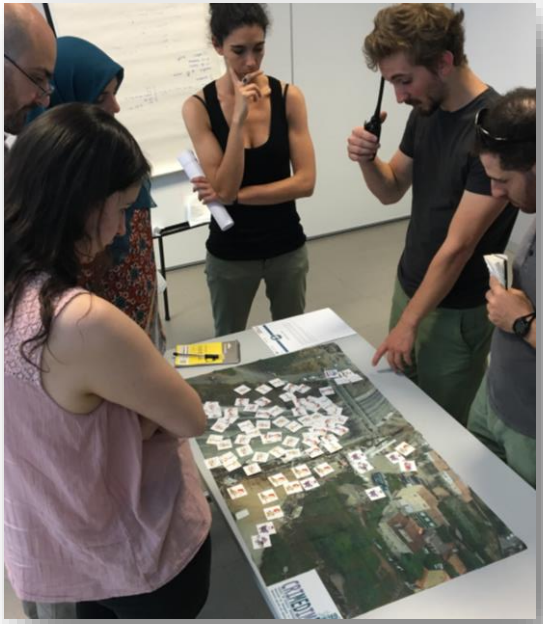

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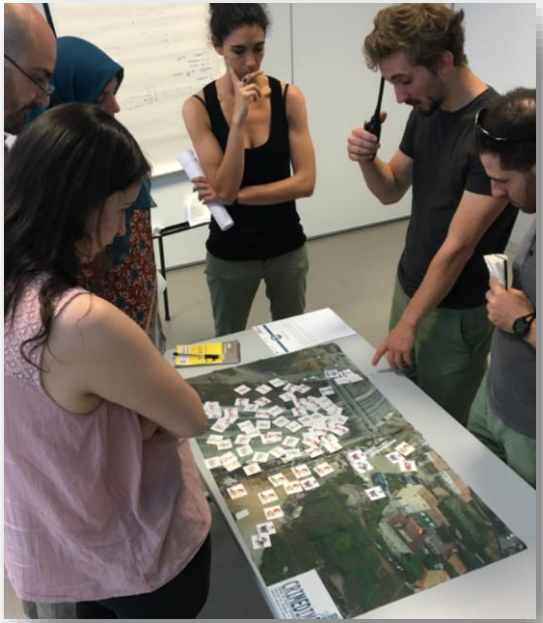


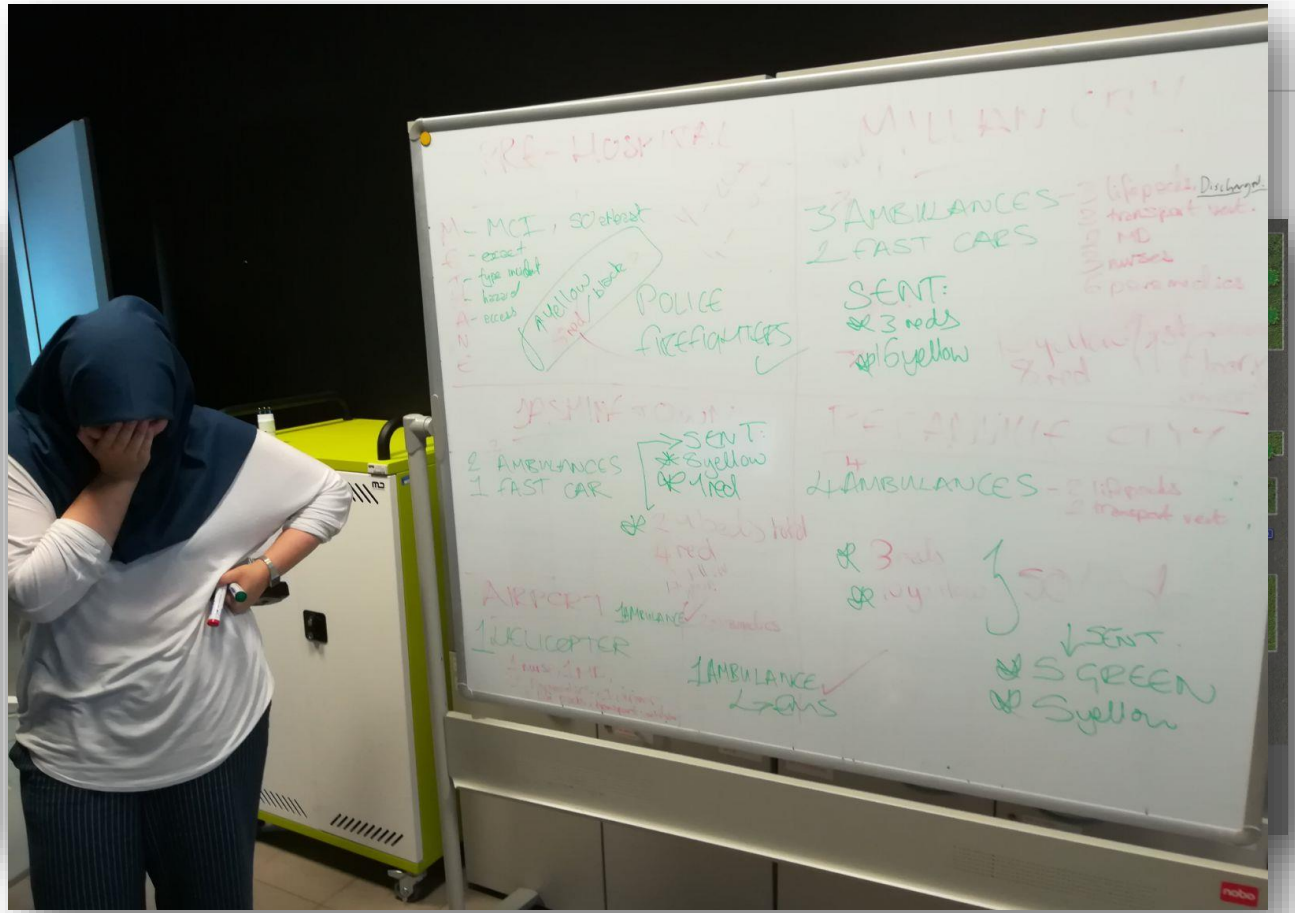
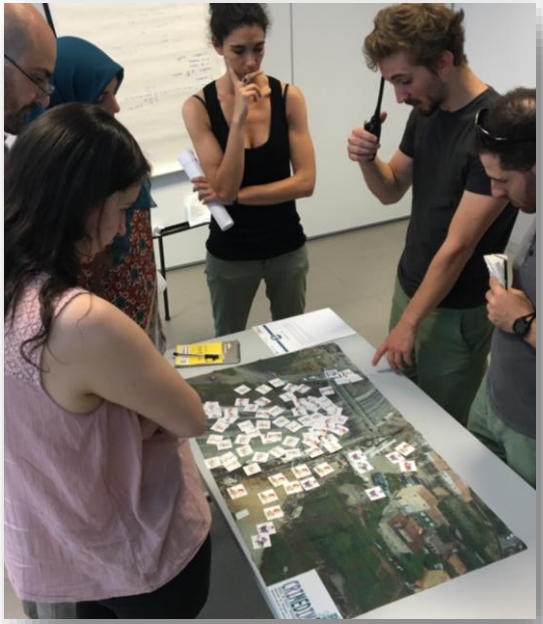

3 AMBULANCES
2 FAST CARS
POLICE
FIREFIGHTERS
SENT:
3 reds
1 yellow
2 AMBULANCES
1 FAST CAR
SENT:
1 yellow
1 red
4 AMBULANCES
1 AMBULANCE
SENT
5 GREEN
1 yellow

Table Top



Real Size Simulation

EM DM EUROPEAN MASTER DISASTER MEDICINE

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Real Size Simulation

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Real Size Simulation

Real Size Simulation

Performance Indicators (PI)

Table 4. Pre-hospital and hospital command-and-control

Activity	Objective
Pre-hospital	
Tabard indicating medical and ambulance incident officer	Immediately
First report to dispatch center	Within 2 minutes
Correct content of first report: METHANE	METHANE
Formulate guidelines for response	Within 3 minutes
Establishing contact with strategic level of command and control	Within 5 minutes
Liaison with fire and police officers on the scene	Within 5 minutes
Second report to command & control center	Within 10 minutes
Correct content of second report: first patient evacuated	Indicate when First Patient will be evacuated
Establishing level of medical ambition	Within 10 minutes
First patient evacuated	Within 15 minutes
Information to media on the scene	Within 30 minutes
SUBTOTAL	
Hospital	
Declare a major incident	Within 1 minutes
Deciding on level of preparedness for strategic management	Within 3 minutes
Decide what additional resources will be needed	Within 3 minutes
Establish contact with strategic management	Within 5 minutes
Assigning functions and positioning according to the plan	Inmediato
Establishing level of medical ambition	Within 10 minutes
Establishing contact with the scene	Within 5 minutes
Staff briefing	Within 8 minutes
Content of staff briefing: situation report	Yes/No
Assignments	Yes/No
Summarizing	Yes/No
Time of new staff briefing	Yes/No
Information to press release	Within 30 minutos
Correct content of press release	Check First Report

Impact of training in medical disaster management: a pilot study using a new tool for live simulation

PIER LUIGI INGRASSIA[1], DAVIDE COLOMBO[1], FEDERICO LORENZO BARRA[1], LUCA CARENZO[1], JEFFREY FRANC[2], FRANCESCO DELLA CORTE[1]

[1]CRIMEDIM Research Center in Disaster and Emergency Medicine, Department of Translational Medicine, Università del Piemonte Orientale "A. Avogadro", Novara, Italy. [2]University of Alberta, Edmonton, Canada.

ADULT Learning

- Adults prefer to learn by doing
- Debriefing is the key of experiential adult learning
- Objective debriefing makes the learning more effective and efficient

EXPERIENCE ⟷ DEBRIEFING ⟷ COMPREHENSION

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Innovative approaches to Emergency and Disaster Medicine Education

Innovative approaches to Emergency and Disaster Medicine Education

- The use of state-of-the-art technologies in both traditional an non-traditional manners

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- Applying different educational methodologies into the same educational programs to enhance students' understanding and learning through meaningful experience

Innovative approaches to Emergency and Disaster Medicine Education

- The use of state-of-the-art technologies in both traditional an non-traditional manners
- Applying different educational methodologies into the same educational programs to enhance students' understanding and learning through meaningful experience
- Ongoing process to re-define the learning objectives and to adapt technologies and methodologies accordingly

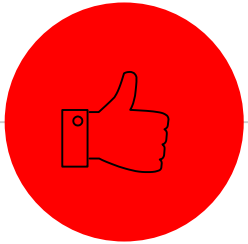
The Art of Innovation

By Guy Kawasaki

The Art of Innovation

TEDx By Guy Kawasaki

- Make meaning → desire to change the world
- “Jump curves” concept → evolution, curiosity, creativity
- Let 100 flowers blossom → people as resources



Thanks!

Any questions ?

You can find me at

- marta.caviglia@med.uniupo.it

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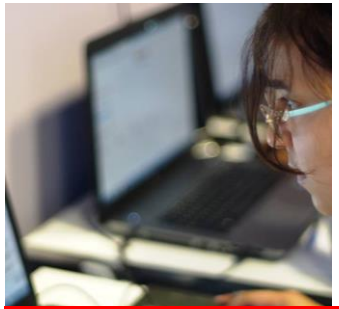
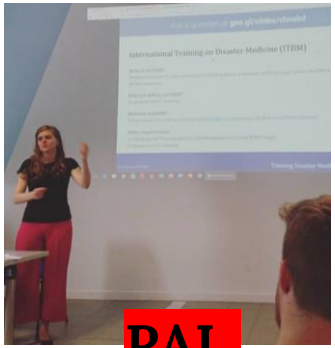
WORKSHOP



E-LEARNING



PAL

TABLE TOP

VIRTUAL REALITY

REAL SIZE